

POSITIONAL AND SPONTANEOUS NYSTAGMUS
(8-IML-1)

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Nystagmus is an involuntary oscillation of the eyes with a slow eye movement in one direction and a compensatory quick eye movement in the opposite direction to return the eyes to their original position. The slow phase of nystagmus is often generated by asymmetry in the peripheral vestibular system, and generally nystagmus in the horizontal direction dominates although vertical and rotary nystagmus can be seen in certain pathological situations.

Peripheral spontaneous nystagmus has been defined as nystagmus that has a direction-fixed slow phase and beats with about the same slow phase velocity in all head positions. Spontaneous nystagmus is generally accepted as a manifestation of an inherent asymmetry in the peripheral vestibular system. Such asymmetry is generally secondary to neural disorders of the inner ear such as labyrinthitis, Meniere's disease, acoustic neuroma, etc.

If nystagmus is present that changes magnitude or direction of the slow phase velocity with change of head position relative to the force of gravity, then the nystagmus is defined as a positional nystagmus. It has been implied in the literature that positional and spontaneous nystagmus do not occur simultaneously. It is our impression that positional and spontaneous nystagmus can occur simultaneously as independent phenomena and that the slow phase velocity components of the nystagmus generated in each case are additive.

Peripheral spontaneous nystagmus is an important clinical parameter since it is a measure of asymmetry in the peripheral vestibular system caused by disease. We have always assumed that any nystagmus observed in a neutral position relative to the force of gravity (i.e., sitting, supine, etc.) represents the component of spontaneous nystagmus. The only way to validate this assumption is to eliminate the positional nystagmus via the weightless environment and observe for any residual spontaneous nystagmus.

Many normal subjects have low intensity spontaneous and/or positional nystagmus with eyes closed that can be measured with electro-oculography (EOG). The experimental conditions can be attained by measuring nystagmus while performing positional tests on appropriate subjects before, during, and after space flight.

Data for the PSN experiment will be collected in conjunction with the Space Adaptation Syndrome Experiment (SASE). At one point in SASE, the subject is seated stationary on the sled with horizontal EOG electrodes applied. Horizontal nystagmus data will be collected with

the head in a neutral position and with the head tilted to the extreme right and left lateral positions.

This relatively simple experiment should help to answer the question as to whether spontaneous nystagmus and positional nystagmus are superimposed and, as well, determine whether nystagmus observed in a neutral position reflects the spontaneous component.